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IS 4162-3 (1985): Specification for Graduated Pipettes,  
Part 3: Pipettes For Which a Waiting Time of 15s Is  
Specified [CHD 10: Glassware]



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**IS : 4162 ( Part 3 ) - 1985**

*Indian Standard*

**REAFFIRMED**

**21 2007**

**SPECIFICATION FOR GRADUATED PIPETTES**

**PART 3 PIPETTES FOR WHICH A WAITING TIME OF  
15s IS SPECIFIED**

*( First Revision )*

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**BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002**

**AMENDMENT NO. 1 JULY 2007  
TO  
IS 4162 (PART 3) : 1985 SPECIFICATION FOR  
GRADUATED PIPETTES**

**PART 3 PIPETTES FOR WHICH A WAITING TIME OF  
15s IS SPECIFIED**

*( First Revision )*

*(Page 5, clause 7.1.1) — Substitute the following for the existing clause:*

**‘7.1.1 Graduated pipettes shall be constructed from glass of suitable chemical and thermal properties, shall be as far as possible, free from visible defects and shall be reasonably free from internal stress. When graded according to the method prescribed in IS 2303 (Part 1/Sec 1) : 1994\*, the pipettes shall conform to Class HGB 1 of the glass.’**

*(Page 5, footnote marked \*) — Substitute the following for the existing:*

**‘\*Grading glass for alkalinity : Part 1 Hydrolytic resistance, Section 1 Hydrolytic resistance of glass grains at 98°C - Method of test and classification (first revision).’**

*(Page 8, clause 13.1.1) — Substitute the following for the existing clause:*

**‘13.1.1 BIS Certification Mark**

**The pipette may also be marked with the Standard Mark.**

**13.1.1.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.’**

**(CHD 10)**

## *Indian Standard*

### SPECIFICATION FOR GRADUATED PIPETTES

#### PART 3 PIPETTES FOR WHICH A WAITING TIME OF 15s IS SPECIFIED

#### *( First Revision )*

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( *Continued on page 2* )

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## *Indian Standard*

### SPECIFICATION FOR GRADUATED PIPETTES

#### PART 3 PIPETTES FOR WHICH A WAITING TIME OF 15s IS SPECIFIED

#### *( First Revision )*

#### 0. FOREWORD

**0.1** This Indian Standard ( Part 3 ) ( First Revision ) was adopted by the Indian Standards Institution on 30 October 1985, after the draft finalized by the Laboratoryware and Related Apparatus Sectional Committee had been approved by the Chemical Division Council.

**0.2** This standard was originally published as IS : 4162-1967\*. Subsequently International Organization for Standardization brought out the following Standards:

ISO : 835/1-1981 Laboratory glassware — Graduated pipettes:  
Part 1 General requirements

ISO : 835/2-1981 Laboratory glassware — Graduated pipettes:  
Part 2 Pipettes for which no waiting time is specified

ISO : 835/3-1981 Laboratory glassware — Graduated pipettes:  
Part 3 Pipettes for which a waiting time of 15s is specified

ISO : 835/4-1981 Laboratory glassware — Graduated pipettes:  
Part 4 Blow-out pipettes.

The Committee responsible for the preparation of this standard decided to revise IS: 4162-1967\* to align this standard with the above ISO standards. Accordingly this standard is now being revised in four parts: Part 1 General requirements; Part 2 Pipettes for which no waiting time is specified; Part 3 Pipettes for which a waiting time of 15s is specified; and Part 4 Blow-out pipettes.

**0.3** In this revision the following have been included:

- a) Method of setting of meniscus,
- b) Procedure for measurement of capacity,

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\*Specification for graduated pipettes.



## **IS : 4162 ( Part 3 ) - 1985**

- c) 0.5 ml capacity pipettes with Class A accuracy for type 4 only,
- d) Pipettes for which a waiting time of 15s has been specified,
- e) Pipettes — known as blow-out pipettes, and
- f) Table for dimensions has been modified to bring in line with ISO Standards.

**0.4** This standard contains 13.2 which calls for agreement between the purchaser and the supplier.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final values, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960\*. The number of significant places retained in the rounded off values should be the same as that of the specified values in this standard.

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### **1. SCOPE**

**1.1** This standard ( Part 3 ) specifies the requirements for graduated pipettes with comparatively large jets, for which waiting time of 15s is specified in order to compensate for the possible effect of shorter delivery time, and which are suitable for general laboratory purposes. They are adjusted to Class A accuracy.

**1.1.1** The requirements specified are in conformity with IS : 8729-1977†.

**1.1.2** The requirements specified in Part 1 of this standard shall apply.

### **2. TERMINOLOGY**

**2.1** For the purpose of this standard definitions given in Part 1 of the standard, shall apply.

### **3. TYPES OF PIPETTES**

**3.1** Graduated pipettes for which a waiting time of 15s is specified shall be of one type as indicated below:

**Type 4 —** Graduated pipettes adjusted for delivery of a liquid from zero line at the top to any graduation line, nominal capacity obtained by delivery down to the jet, 15s waiting time specified for accuracy Class A only.

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\*Rules for rounding off numerical values ( revised ).

†Principles of construction and adjustment of volumetric glassware.

#### **4. ACCURACY**

**4.1** The graduated pipettes shall have A Class of accuracy only and shall conform to the requirement of 4, Part 1 of this standard.

#### **5. NOMINAL CAPACITY**

**5.1** The graduated pipettes shall be 0.5 ml, 1 ml, 2 ml, 5 ml, 10 ml and 25 ml nominal capacities respectively.

#### **5.2 Procedure for Measurement of Capacity**

**5.2.1** The procedure given in 5.2, Part 1 of this standard shall be followed.

#### **6. LIMITS OF VOLUMETRIC ERROR**

**6.1** Errors in the delivered Volume of Class A graduated pipettes shall not exceed the limits shown in Table 1, Part 1 of this standard.

#### **7. CONSTRUCTION**

##### **7.1 Material**

**7.1.1** Graduated pipettes shall be constructed from glass of suitable chemical and thermal properties, shall be as far as possible free from visible defects and shall be reasonably free from internal stress. When graded according to the method prescribed in IS:2303-1963\* the pipettes shall conform to Type 1 of the glass.

**7.2 Dimensions** — Graduated pipettes shall comply with the dimensional requirements given in Table 2, Part 1 of this standard.

##### **7.3 Finish, Top of Pipettes and Delivery Jet**

**7.3.1** Graduated pipettes shall comply with the requirements given in 7.3, 7.3.1 and 7.3.2, Part 1 of this standard.

#### **8. GRADUATION AND FIGURING**

**8.1** Graduated pattern 1 or 2 of 8.3.1 and 8.3.2, Part 1 of this standard, shall be applied and typical figuring of graduation shall be as shown in Fig. 1.

**8.2** Lowest graduation and lowest figured graduation lines shall be in accordance with Table 1.

#### **9. PERMANENCY AND VISIBILITY OF GRADUATION LINES, FIGURES INSCRIPTIONS AND MARKINGS**

**9.1** Graduation pipettes shall comply with the requirements given in 9, Part 1 of this standard.

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\*Method of grading glass of alkalinity.

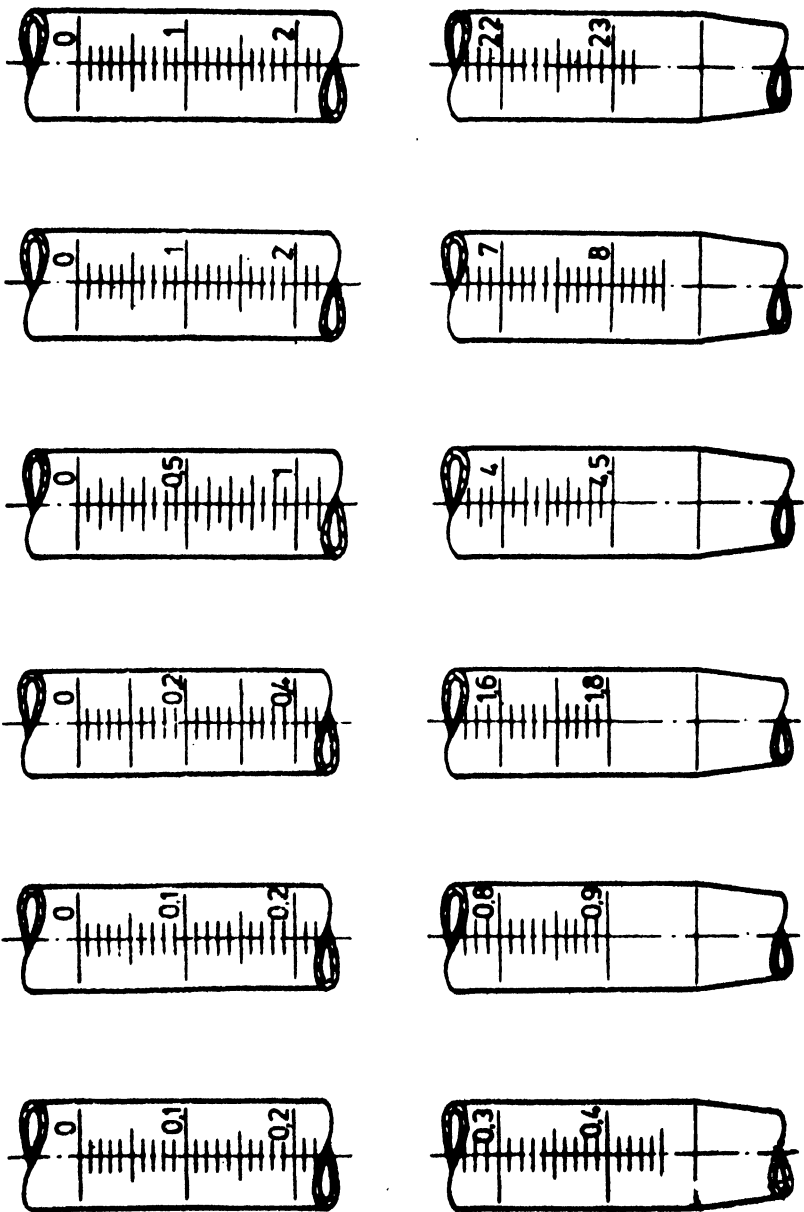


FIG. 1 GRADUATION AND FIGURING OF CLASS 'A', PIPETTES, TYPE 4, PATTERN 2

TABLE 1 LOWER-END OF SCALE

( Clause 8.2 )

SL No.	NOMINAL CAPACITY	LOWEST FIGURES GRADUATION LINE	LOWEST GRADUATION LINE
( 1 )	( 2 )	( 3 )	( 4 )
	ml	ml	ml
i)	0.5	0.5	0.45
ii)	1.0	0.9	0.9
iii)	2.0	1.8	1.8
iv)	5.0	4.5	4.5
v)	10.0	8.0	8.5
vi)	25.0	23.0	23.2

## 10. SETTING OF THE MENISCUS

10.1 Setting of the meniscus shall be performed in accordance with 10, Part 1 of this standard.

## 11. DELIVERY TIME

11.1 When the delivery time is marked on the pipette, then the observed delivery time and the marked delivery time shall both be within the limits given in Table 2 and shall not differ by more than 2s.

TABLE 2 DELIVERY TIMES

NOMINAL CAPACITY	DELIVERY TIMES	
	Min	Max
ml	s	s
0.5	2	8
1	2	8
2	2	8
5	5	11
10	5	11
25	9	15

## 12. COLOUR CODING

12.1 If colour coding is used on the graduated pipettes, it shall comply with the requirements of IS : 11468-1985\* and IS : 11469-1985†.

\*Specification for colour coding of pipettes.

†Method of assessing chemical resistance of enamels used in colour coding.

### **13. MARKING AND PACKING**

**13.1** Each pipettes shall be marked permanently and legibly on surface with the following information:

- a) Nominal capacity followed by 'ml';
- b) Letter 27°C to indicate the reference temperature;
- c) Letter 'A' to indicate the class of accuracy for which the pipette has been adjusted;
- d) Waiting time of 15s shall be indicated on the graduated pipettes;
- e) Delivery time;
- f) Type of pipette;
- g) Letter 'Ex' to indicate that the pipette has been adjusted for delivery; and
- h) Maker's name or recognized trade-mark, if any.

**13.1.1** The pipette may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on the products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products and also continuously checked by ISI for conformity to that standard under as a further safeguard. Details of conditions under which a licence for the ISI Certification Mark may be granted to manufacturer or processors, may be obtained from the Indian Standards Institution.

**13.2** The pipettes shall be packed as agreed to between the purchaser and the supplier.

### **14. SAMPLING**

**14.1** Representative samples of the graduated pipettes shall be drawn as prescribed in Appendix C of Part 1 of this standard.

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